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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/629,213	07/31/2000	Chie-Chi Chen	TS2000-023	3986

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EXAMINER	
KORNAKOV, MICHAIL	
ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/629,213	Applicant(s) CHEN ET AL.	
	Examiner Michael Kornakov	Art Unit 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *12* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 26, 2003 has been entered.

2. Claims 11-18 are pending.

3. Applicants' attention is drawn to the fact that the clean version of claim 15 differs from the version of claim 15 with markings.

Thus, clean version of claim 15 recites "**intermittently** changing said pressure of said pressure regulated gas supply" (Paper 11, page 3, line 38) and "removing said **wafer cassette** from said **photoresist stripping liquid**" (page 4, line 1).

Version of claim 15 with markings recites "**alternate** changing a gas pressure of said pressure regulated gas supply" (page 11, lines 4-5) and "removing said **substrate carrier** from said **chemical liquid**" (page 11, line 9).

A telephone call has been made to Applicants' representative, Mr. S. Ackerman, esq., in order to verify the issue and speed up the prosecution on the merits.

Mr. S. Ackerman has acknowledged the difference between the clean and marked versions of claim 15 and informed that the clean version is the correct one. Therefore, the clean version of claim 15 is examined on the merits.

Claim Objections

4. Claim17 is objected to as being a duplicate of claim 13. In order to overcome the objection, applicants are advised to cancel or amend either claim 17 or claim 13.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 11-18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- Claim 11 recites "removing **cohesive coatings**" (Paper 11; page 2, line 1). Claim 15 recites "stripping **cohesive photoresist**" (as amended in Paper 11, page 3, line 29). However, while reciting "a method for effectively stripping obscured photoresist or other organic materials from semiconductor wafers" (page 4, lines 7-9 of the instant specification), the instant disclosure does not address the issue of cohesiveness. In order to prepare the cohesive coating, a special conditioning of utilized materials may

be required, which is not indicated in the instant disclosure. The Merriam-Webster's Collegiate Dictionary defines cohesion as "molecular attraction, by which the particles of a body are united throughout the mass" (page 223, left column), thus indicating a specific matter arrangement, which is not provided by the instant disclosure. This is a new matter situation.

- Claims 11 and 15 recite the step of "**intermittently** changing a pressure of said pressure regulated gas supply for **generating a turbulent** vertical agitation" (as amended in Paper 11; page 2, lines 10-11; page 3, lines 38-39). However the instant disclosure does not provide for **intermittent** change of pressure. It also does not define the character of agitation /motion of fluids, such as **turbulence**, in the processing tank. The instant disclosure recites "a pressurized and regulated gas supply" (page 7, line 19 of the instant specification) and states that "a valve is opened, not shown, directing nitrogen and forming bubbles created by escaping nitrogen gas 59 egressing holes provided in tubing 30 traveling upward while scrubbing the surfaces of the wafers". The instant disclosure **does not support** a step of changing the pressure "**intermittently**" and also **does not provide** any characteristic of fluid motion in the recited cleaning process. **This is a new matter situation**.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 16 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. Claim 16 recites the limitation "said wafer cassette" in page 4, line 48. There is insufficient antecedent basis for this limitation in the claim. Claim 16 depends on claim 11, which recites "a substrate carrier", but not a "wafer cassette".

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Advocate, Jr. et al (U.S. 5,904,156) in view of Molinaro (U.S. 5,082,518) and further in view of JP11-121419.

Advocate teaches a method for removing a photoresist film, which can be particularly utilized for removing of photoresist from the vicinity of semiconductor silicon device structures, interposed by metal stack (col.1, lines 5-13; col.2, lines 65-67; col.6, lines 27-30). The method of Advocate comprises providing a false bottom with gas fan (reads on "gas distribution plate", as instantly claimed), which is placed into strip tank with stripping solution; providing pressurized and flow regulated tube for the supply of inert gas, preferably nitrogen, to gas fan, (reads on "pressure regulated gas supply", as instantly claimed); providing a wafer boat (reads on "substrate carrier" or "wafer cassette" for placement wafers in a vertical position; immersing the said wafer boat with wafers into the stripping solution and positioning it on the false bottom; generating the pressurized gas flow, which causes aggressive bubbling in the solution around the wafers (paragraph, bridging col.8 and 9; col.9, lines 6-20) and provides the scrubbing of wafers surfaces (col. 9, lines 30-31).

In regard to **aligning** the substrates/wafers, as per instant claims 11 and 15, Advocate teaches that wafers are positioned on the false bottom in certain way, having at least one hole below the wafer to release the nitrogen and create bubbling to agitate the stripping solution (col.10, lines 20-23), which reads on the recited limitation.

In regard to a **turbul nt** agitation, as per instant claims 11 and 15, it is noted, that such limitation has been considered as a new matter and rejected under 35 USC 112, first paragraph above.

However, with regard to this limitation Advocate specifically provides for **robust agitation** of stripping solutions (col.9, lines 53-54) and indicates, that introducing of inert gas through a pressurized tube causes **aggressive bubbling** in the solution around wafers (col. 9, lines 8-10), which reads on "vertical turbulent agitation", lacking any support and/or guidance for such agitation in the instant disclosure.

The teaching of Advocate differs from the instant claims by not utilizing quartz as the material for false bottom. Advocate also remain silent about connecting/attaching the false bottom (distribution plate) and gas fan (pressure regulated gas supply). However, quartz is notoriously used as the construction material for making parts for semiconductor wet processing equipment and, specifically bubbling devices.

Thus, Molinaro teaches a gas diffusion system for evenly distributing injected gas in a bath wherein gas manifold is connected/welded to a flat quartz plate having sized holes for evenly spreading and distributing the gas bubbles throughout the treatment liquid (see Abstract, col.1, lines 36-56; col. 2, line 54, 66-68). Molinaro specifically indicates that quartz has material integrity and can have appropriate surface finish to maintain it as inert to the chemicals, thus motivating the skilled artisan to utilize quartz as the material for making parts for wet processing apparatuses.

Therefore, one skilled in the art at the time the invention was made, motivated by the teaching of Molinari, would have found it obvious to utilize quartz as the material for

false bottom and other parts in lieu of stainless steel, used by Advocate in order to enhance visual control over the stripping process of Advocate due to transparency of quartz made parts.

It is also noted here, that connecting gas distribution plate to a pressure regulated gas supply or leaving a distance between this structural elements, or in other words, the configuration of the claimed apparatus is a matter of choice, which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed apparatus is significant, as per In re Dailey, 357 F. 2d 669,149 USPQ 47 (CCPA 1966). If the operation is known in reference to the object, the invention of a new machine for performing it does not make a new process, but only a new instrument for applying it.

While providing for pressurized and flow regulated gas supply, the combined teaching of Advocate and Molinari does not specifically indicate that a pressure of such regulated gas supply is changed **intermittently**.

However, it is first noted, that such limitation has been considered as a new matter and rejected under 35 USC 112, first paragraph above, because there is absolutely no support and/or guidance in the instant specification for intermittent gas supply.

It also should be pointed out that intermittent gas supply is routinely utilized in the art of wet semiconductor cleaning while bubbling the cleaning solutions. For instance, JP'419 teaches a method of cleaning by immersing semiconductor wafers in the processing solution in the tank and **continuously or int rmittently** bubbling the

gaseous media through the processing solution (see Abstract), thus recognizing the equivalency of both techniques for bubbling the gaseous media through the cleaning solution. However, the substitution of equivalent methods requires no express motivation, as long as the prior art recognizes equivalency, ***In re Fount*** 213 USPQ 532 (CCPA 1982); ***In re Siebentritt*** 152 USPQ 618 (CCPA 1967); ***Graver Tank & Mfg. Co. Inc. V. Linde Air products Co***. 85 USPQ 328 (USSC 1950).

In specific regard to the limitations of claims 11, 14, 15 and 18, which are concerned with removing of **cohesive** coatings/photoresists, it is noted here that such limitation has been considered as a new matter and rejected under 35 USC 112, first paragraph above. Besides, it is axiomatic that one who performs the steps of the known process must necessaraly produce all of its advantages. Mere recitation of a newly discovered function, that is inherently possessed by things in the prior art **does not cause a claim** drawn to these things to distinguish over the prior art, consult *In Re* Leinoff v. Louis Milona & Sons, Inc. 220 USPQ 845 (CAFC 1984). Since the processing steps are met by applied references, the result, produced by these steps is reasonably expected.

In specific regard to the limitations of claims 12 and 16, the combined teaching of Advocate and Molinaro provides the diffusion plate with the rows of gas bubble generating apertures (Fig 2 of Molinaro) and teaches that one aperture/hole occurs below the wafer, thus providing for corresponding positioning of each wafer with regard to each row of gas bubble generating apertures.

13. Therefore, combination of references renders claims 11-18 prima facie obvious and properly rejected under 35 U.S.C. 103(a).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bradley et al (U.S. 4,586,961) teaches intermittent agitation while supplying nitrogen into the cleaning solution in the process for removing copper or copper oxides from surfaces.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872 9310 for regular communications and (703) 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

M. KORNAKOV

Michael Kornakov
Examiner
Art Unit 1746

April 11, 2003